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Bias-dependent enhancement of the Fano factor in atomic-scale Au junctions LOAH STEVENS, PAVLO ZOLOTAVIN, RUOYU CHEN, DOUGLAS NATELSON, Rice University — We report measurements of current noise in STM-style Au break junctions at 77K, focusing on the dependence of the Fano factor on applied bias. In room temperature investigations of similar systems, measured noise at low bias (<150 mV) was observed to agree well with Landauer-Büttiker theory for shot noise at a fixed electronic temperature. At higher biases, however, measured noise exhibited a superlinear dependence on scaled bias above the low bias expectations. In the present experiment at cryogenic temperatures, we also observe this nonlinear increase of noise. We will discuss this behavior in terms of an enhancement of the Fano factor above the predicted model for minimum open transmission channels, and how the data constrain possible explanations of this excess noise. Furthermore, we will examine channel mixing in transport through the junction from measured Fano factor and conductance.

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